

FUTURE

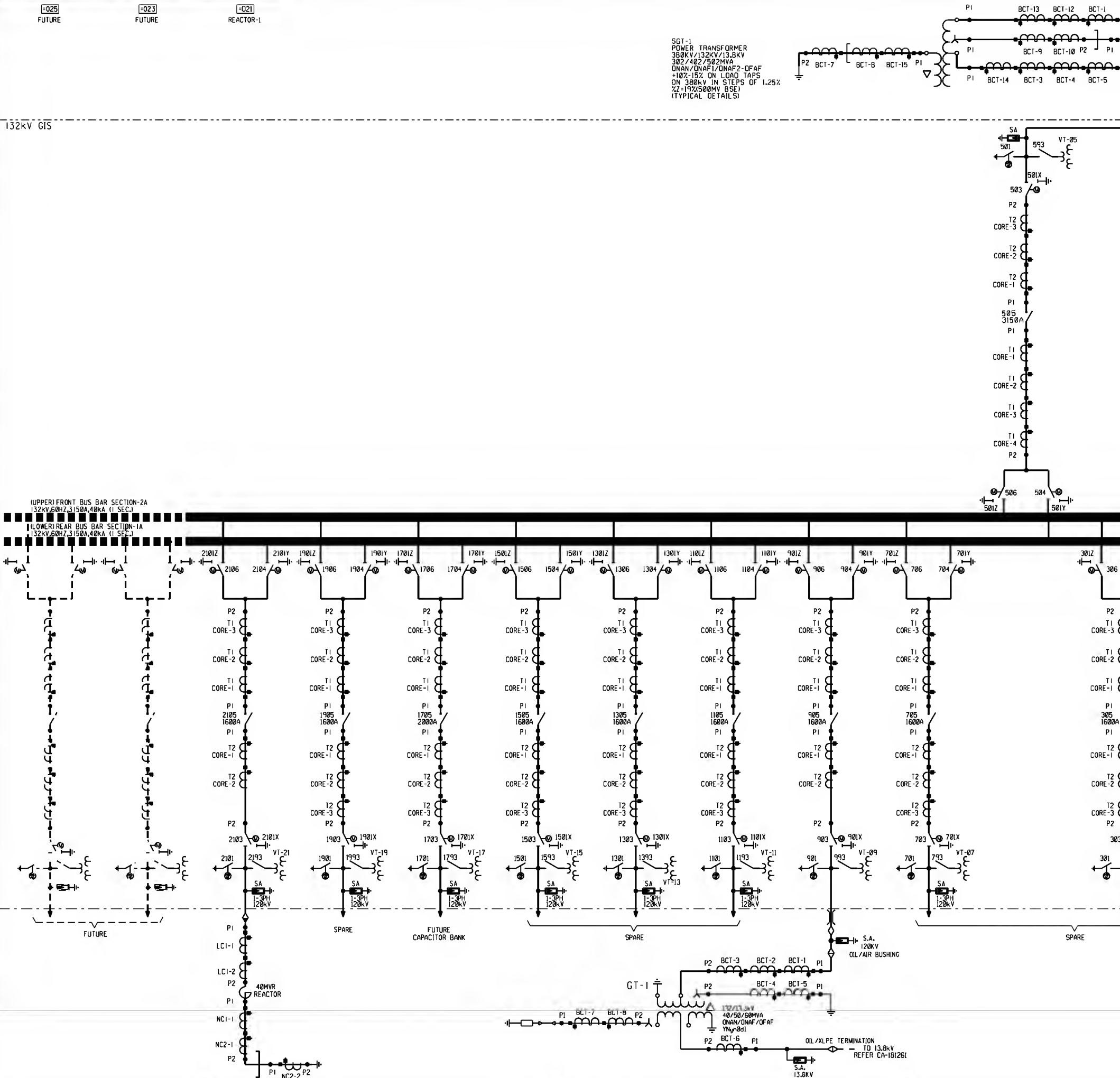
FUTURE

REACTOR-1

SGT-1
POWER TRANSFORMER
380KV/132KV/13.8KV
302/402/502MVA
ONAN/ONAF1/ONAF2-OFAP
+10%-15% ON LOAD TAPS
ON 380KV IN STEPS OF 1.25%
Z2-19%(500MV BSE)
(TYPICAL DETAILS)

132KV GIS

(UPPER) FRONT BUS BAR SECTION-2A
132KV, 50HZ, 3150A, 40KA (1 SEC.)
(LOWER) REAR BUS BAR SECTION-1A
132KV, 50HZ, 3150A, 40KA (1 SEC.)



E0130
BUS COUPLER

E0120
BUS SECTION
E0220

E0230
BUS COUPLER

E002
CABLE-9

E004
GT-2

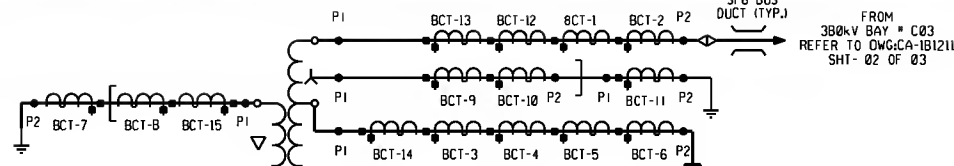
E006
SGT-02

E008
CABLE-10

E010
GT-3

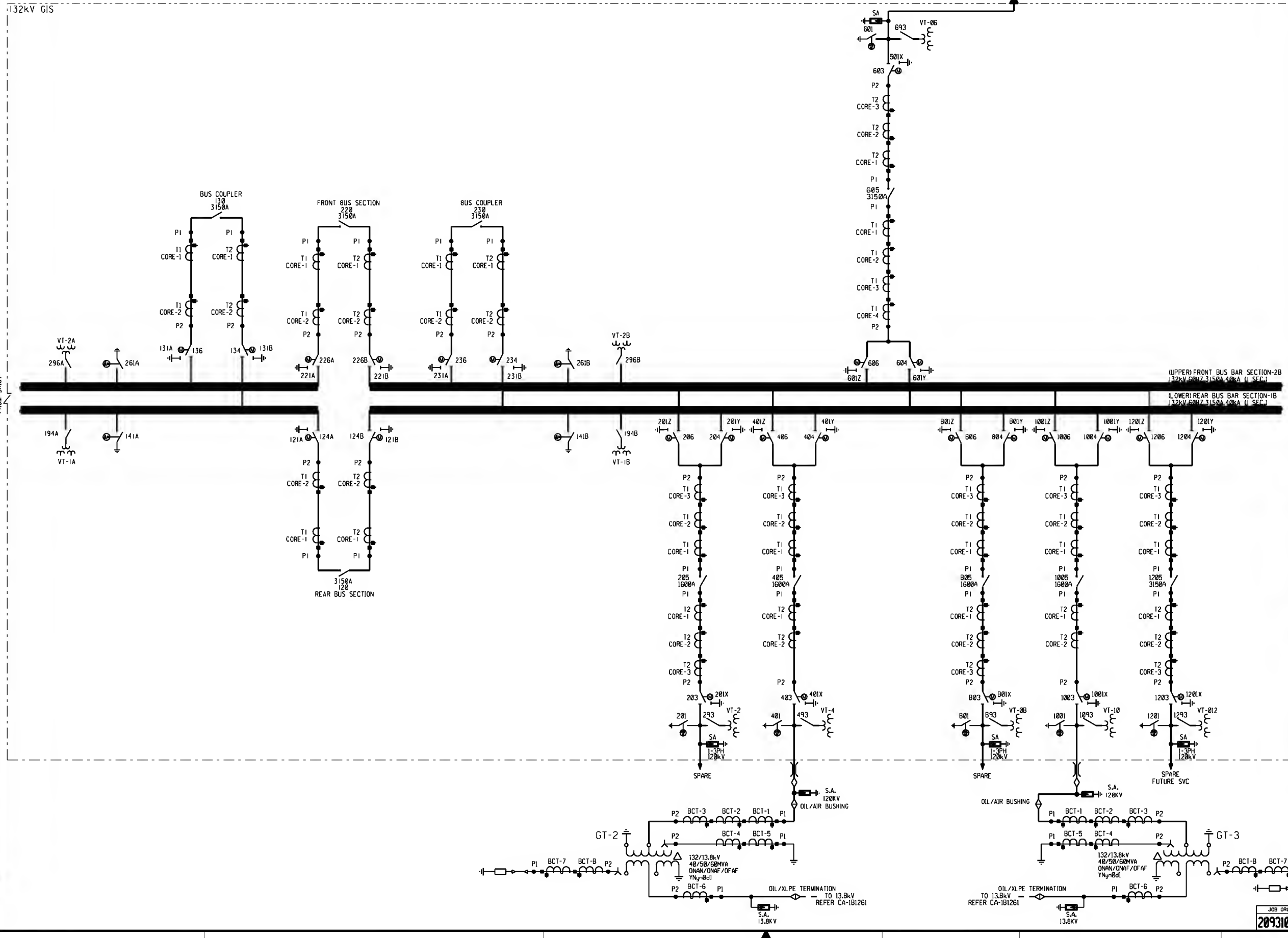
E012
CABLE-11

SGT-2
POWER TRANSFORMER
380KV/132KV/13.8KV
302/402/502MVA
ONAN/ONAF1/ONAF2-OFAP
+10%-15% ON LOAD TAPS
ON 380KV IN STEPS OF 1.25%
ZZ-192(500MV BSE)
(TYPICAL DETAILS)



SF6 BUS
DUCT (TYP.)
FROM
380KV BAY # C03
REFER TO DWG:CA-181211
SHT- 02 OF 03

132kV GIS



NOTES

- CTs FOR 132KV NETWORK ARE SHOWN AS PER SEC STANDARDS SPECIFICATION & PROTECTION REQUIREMENT. THE VALIDITY OF CTs FOR THE SYSTEM WILL BE ENSURED AFTER CT SIZING CALCULATION.
- THE CTs SHALL BE INSIDE DELTA WINDING.

LEGEND

- CIRCUIT BREAKER (SF6)
- HIGH SPEED MOTORIZED EARTH SWITCH
- MOTORIZED DISCONNECT SWITCH
- MAINTENANCE EARTHING SWITCH
- COMBINE MOTORIZED DISCONNECT/EARTH SWITCH
- CURRENT TRANSFORMER
- AUTO TRANSFORMER (SGT)
- VOLTAGE TRANSFORMER
- SURGE ARRESTER (OUTDOOR TYPE)
- SURGE ARRESTER (GIS TYPE)
- FUTURE LINE
- CABLE
- ZIG ZAG TRANSFORMER
- SF6/AIR BUSHING
- SF6/OIL INTERFACE ENCLOSURE OF SGT

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NO.
DRAWING CONTROL SHEET	CE-195451

AS-BUILT BY: _____ DATE: _____

REV. NO.	DATE	BY	DESCRIPTION	CHKD.	CERT.	APPD.
01	26-03-11	DAR	REVISED AS PER SEC LETTER #B30343/0036/11 DATED:22/03/2011	TAMER	YAHYA	YAHYA
00	31-01-11	DAR	FOR APPROVAL	TAMER	YAHYA	YAHYA

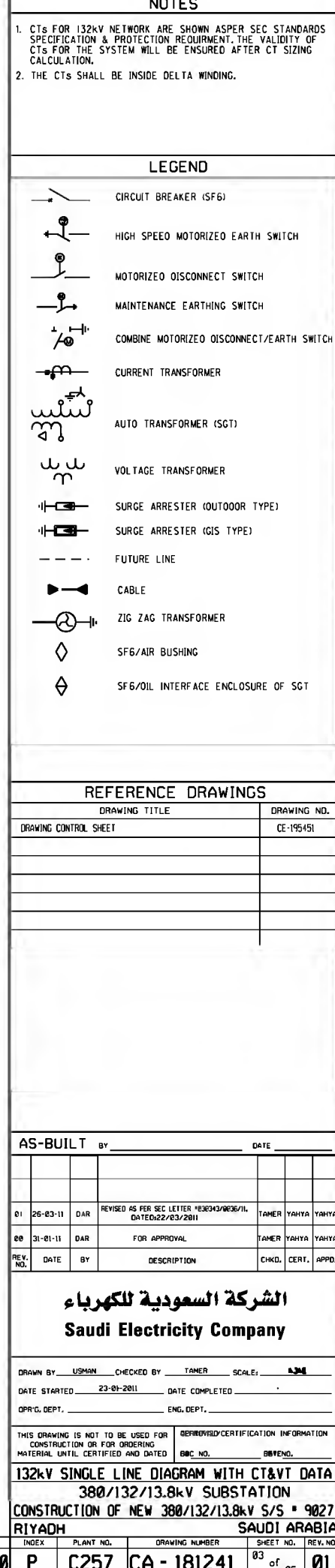
الشركة السعودية للكهرباء
Saudi Electricity Company

DRAWN BY: USMAN CHECKED BY: TAMER SCALE: 1:1
DATE STARTED: 23-01-2011 DATE COMPLETED: _____
OPR.G. DEPT.: _____ ENG. DEPT.: _____

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132kV SINGLE LINE DIAGRAM WITH CT&VT DATA
CONSTRUCTION OF NEW 380/132/13.8kV S/S # 9027
RIYADH SAUDI ARABIA

JOB ORDER NO.	INDEX	PLANT NO.	DRAWING NUMBER	SHEET NO.	REV. NO.
20931021/00	P	C257	CA - 181241	02 of 05	01



SEC-CTA SPEC. NO.	LOCATION		132kV FUTURE SVC SPARE BAYS GIS CURRENT TRANSFORMER DATA					FUNCTION
		CT.	CORE NO.	RATIO	CLASS	TECHNICAL DATA	BUROEN	
PR9027	132kV GIS, =012		CORE -1	3000/1A	CL.PX	Vkp>4200V, Rct<6ohm Im<8.33mA	---	MAIN-1 PROTECTION (FUTURE)
				2500/1A	CL.PX	Vkp>3500V, Rct<5ohm Im<10mA	---	
				2000/1A	CL.PX	Vkp>2800V, Rct<4ohm Im<12.5mA	---	
				1600/1A	CL.PX	Vkp>2240V, Rct<3.2ohm Im<15.6mA	---	
				1200/1A	CL.PX	Vkp>1680V, Rct<2.4ohm Im<20.8mA	---	
				1000/1A	CL.PX	Vkp>1400V, Rct<2ohm Im<25mA	---	
		T1	CORE -2	3000/1A	CL.PX	Vkp>4200V, Rct<6ohm Im<8.33mA	---	MAIN-2 PROTECTION (FUTURE)
				2500/1A	CL.PX	Vkp>3500V, Rct<5ohm Im<10mA	---	
				2000/1A	CL.PX	Vkp>2800V, Rct<4ohm Im<12.5mA	---	
				1600/1A	CL.PX	Vkp>2240V, Rct<3.2ohm Im<15.6mA	---	
				1200/1A	CL.PX	Vkp>1680V, Rct<2.4ohm Im<20.8mA	---	
				1000/1A	CL.PX	Vkp>1400V, Rct<2ohm Im<25mA	---	
			CORE -3	3000/1A	CL.PX	Vkp>4200V, Rct<6ohm Im<8.33mA	---	SPARE
				2500/1A	CL.PX	Vkp>3500V, Rct<5ohm Im<10mA	---	
				2000/1A	CL.PX	Vkp>2800V, Rct<4ohm Im<12.5mA	---	
				1600/1A	CL.PX	Vkp>2240V, Rct<3.2ohm Im<15.6mA	---	
				1200/1A	CL.PX	Vkp>1680V, Rct<2.4ohm Im<20.8mA	---	
				1000/1A	CL.PX	Vkp>1400V, Rct<2ohm Im<25mA	---	
		T2	CORE -1	3000/1A	CL.PX	Vkp>4200V, Rct<6ohm Im<8.33mA	---	FR+METERING (THROUGH SATURABLE CT.)
				2500/1A	CL.PX	Vkp>3500V, Rct<5ohm Im<10mA	---	
				2000/1A	CL.PX	Vkp>2800V, Rct<4ohm Im<12.5mA	---	
				1600/1A	CL.PX	Vkp>2240V, Rct<3.2ohm Im<15.6mA	---	
				1200/1A	CL.PX	Vkp>1680V, Rct<2.4ohm Im<20.8mA	---	
				1000/1A	CL.PX	Vkp>1400V, Rct<2ohm Im<25mA	---	
CORE -2	4000/1A		CL.PX	Vkp>800V, Rct<6ohm Im<25mA	---	878 BUSBAR PROT.(OISC. ZONE)		
CORE -3	4000/1A		CL.PX	Vkp>800V, Rct<6ohm Im<25mA	---	878 BUSBAR PROT.(CHECK ZONE)		

SEC-CTA SPEC. NO.	LOCATION	132kV FUTURE CAPACITOR BANK SPARE BAYS GIS CURRENT TRANSFORMER DATA						FUNCTION
		CT.	CORE NO.	RATIO	CLASS	TECHNICAL DATA	8URDEN	
PR9027	132kV GIS, =017 =024	T1	CORE-1	2000/1A	CL.PX	Vkp>3500V, Rct<5ohm Im<10mA	---	MAIN-1 PROTECTION (FUTURE)
	1600/1A			CL.PX	Vkp>2800V, Rct<4ohm Im<12.5mA	---		
	1200/1A			CL.PX	Vkp>2100V, Rct<3ohm Im<16.7mA	---		
	1000/1A			CL.PX	Vkp>1750V, Rct<2.5ohm Im<20mA	---		
	800/1A			CL.PX	Vkp>1400V, Rct<2ohm Im<25mA	---		
	CORE-2		2000/1A	CL.PX	Vkp>3500V, Rct<5ohm Im<10mA	---	MAIN-2 PROTECTION (FUTURE)	
			1600/1A	CL.PX	Vkp>2800V, Rct<4ohm Im<12.5mA	---		
			1200/1A	CL.PX	Vkp>2100V, Rct<3ohm Im<16.7mA	---		
			1000/1A	CL.PX	Vkp>1750V, Rct<2.5ohm Im<20mA	---		
			800/1A	CL.PX	Vkp>1400V, Rct<2ohm Im<25mA	---		
	CORE-3		2000/1A	CL.PX	Vkp>3500V, Rct<5ohm Im<10mA	---	SPARE	
			1600/1A	CL.PX	Vkp>2800V, Rct<4ohm Im<12.5mA	---		
			1200/1A	CL.PX	Vkp>2100V, Rct<3ohm Im<16.7mA	---		
			1000/1A	CL.PX	Vkp>1750V, Rct<2.5ohm Im<20mA	---		
			800/1A	CL.PX	Vkp>1400V, Rct<2ohm Im<25mA	---		
	T2	CORE-1	2000/1A	CL.PX	Vkp>3500V, Rct<5ohm Im<10mA	---	FR+METERING (THROUGH SATURABLE CT.)	
			1600/1A	CL.PX	Vkp>2800V, Rct<4ohm Im<12.5mA	---		
			1200/1A	CL.PX	Vkp>2100V, Rct<3ohm Im<16.7mA	---		
			1000/1A	CL.PX	Vkp>1750V, Rct<2.5ohm Im<20mA	---		
			800/1A	CL.PX	Vkp>1400V, Rct<2ohm Im<25mA	---		
		CORE-2	4000/1A	CL.PX	Vkp>800V, Rct<6ohm Im<25mA	---	87B BUSBAR PROT.(AISC. ZONE)	
		CORE-3	4000/1A	CL.PX	Vkp>800V, Rct<6ohm Im<25mA	---	87B BUSBAR PROT.(CHECK ZONE)	

SEC-CTA SPEC. NO.	LOCATION	132kV GT 8AYS GIS CURRENT TRANSFORMER DATA						FUNCTION	
		CT.	CORE NO.	RATIO	CLASS	TECHNICAL DATA	BUROEN		
PR9027	132KV GIS, =004 =009 =010	T1	CORE-1	300/1A	5P20	---	30VA	FR+METERING	
			CORE-2	300/1A	CLPX	Vkp>360V, Rct<Iohm Im<50mA	---		MAIN-2 PROT (BOX-2)
			CORE-3	300/1A	CLPX	Vkp>360V, Rct<Iohm Im<50mA	---		MAIN-1 PROT (BOX-1)
		T2	CORE-1	4000/1A	CLPX	Vkp>800V, Rct<6ohm Im<25mA	---	87B BUSBAR PROT.(AISC. ZONE)	
			CORE-2	4000/1A	CLPX	Vkp>800V, Rct<6ohm Im<25mA	---	87B BUSBAR PROT.(CHECK ZONE)	

SEC-CTA SPEC. NO.	LOCATION	132kV REACTOR BAYS GIS CURRENT TRANSFORMER DATA						FUNCTION	
		CT.	CORE NO.	RATIO	CLASS	TECHNICAL DATA	BUROEN		
PR9027	132kV GIS, =021 =026	T1	CORE-1	1200/1A	CLPX	V _{kvp} >2400V, R _{ct} <6ohm Im<8.33mA	---	FR+METERING (THROUGH SATURABLE IPCT.)	
				600/1A	CLPX	V _{kvp} >1200V, R _{ct} <3ohm Im<16.7mA	---		
				400/1A	CLPX	V _{kvp} >800V, R _{ct} <2ohm Im<25mA	---		
				200/1A	CLPX	V _{kvp} >400V, R _{ct} <1ohm Im<50mA	---		
			CORE-2	1200/1A	CLPX	V _{kvp} >2400V, R _{ct} <6ohm Im<8.33mA	---		BACKUP. O/C & E/F +CBF
				600/1A	CLPX	V _{kvp} >1200V, R _{ct} <3ohm Im<16.7mA	---		
				400/1A	CLPX	V _{kvp} >800V, R _{ct} <2ohm Im<25mA	---		
				200/1A	CLPX	V _{kvp} >400V, R _{ct} <1ohm Im<50mA	---		
			CORE-3	1200/1A	CLPX	V _{kvp} >2400V, R _{ct} <6ohm Im<8.33mA	---		REACTOR DIFF.PROD. (87C)
				600/1A	CLPX	V _{kvp} >1200V, R _{ct} <3ohm Im<16.7mA	---		
				400/1A	CLPX	V _{kvp} >800V, R _{ct} <2ohm Im<25mA	---		
				200/1A	CLPX	V _{kvp} >400V, R _{ct} <1ohm Im<50mA	---		
		T2	CORE-1	4000/1A	CLPX	V _{kvp} >800V, R _{ct} <6ohm Im<25mA	---	87B BUSBAR PROT.(IOISC. ZONE)	
			CORE-2	4000/1A	CLPX	V _{kvp} >800V, R _{ct} <6ohm Im<25mA	---	87B BUSBAR PROT.(CHECK ZONE)	

SEC-CTA SPEC. NO.	LOCATION		132kV BUS COUPLER 8AYS GIS CURRENT TRANSFORMER DATA					FUNCTION
		CT.	CORE NO.	RATIO	CLASS	TECHNICAL DATA	BUROEN	
PR027	132KV GIS, BUS COUPLER =0130 =0230	T1	CORE-1	4000/1A	0.2FS5	---	30VA	METERING
				2000/1A	0.2FS5	---	15VA	
			CORE-2	4000/1A	CLPX	Vkp>800V, Rct<6ohm Im<25mA	---	
		T2	CORE-1	4000/1A	5P20	---	30VA	O/C BACKUP PROT.
			CORE-2	4000/1A	CLPX	Vkp>800V, Rct<6ohm Im<25mA	---	87B BUSBAR PROT.(DISC. ZONE)

SEC-CTA SPEC. NO.	LOCATION		132kV BUS SECTION BAYS GIS CURRENT TRANSFORMER DATA					FUNCTION
		CT.	CORE NO.	RATIO	CLASS	TECHNICAL DATA	BUREEN	
PR027	132kV GIS, BUS SECTION =0120 =0220	T1	CORE-1	4000/1A	0.2F55	---	30VA	METERING
				2000/1A	0.2F55	---	15VA	
			CORE-2	4000/1A	CLPX	Vkp>800V, Rct<6ohm Im<25mA	---	
		T2	CORE-1	4000/1A	5P20	---	30VA	O/C BACKUP PROT.
			CORE-2	4000/1A	CLPX	Vkp>800V, Rct<6ohm Im<25mA	---	87B BUSBAR PROT.(DISC. ZONE)

SEC-CTA SPEC. NO.	LOCATION		132kV SGT 8AYS GIS CURRENT TRANSFORMER DATA					FUNCTION	
		CT.	CORE NO.	RATIO	CLASS	TECHNICAL DATA	BURDEN		
PR9027	132kV GIS, =005 (SGT-1) =006 (SGT-2) =014 (SGT-3)	T1	CORE-1	3000/1A	0.2F55	---	30VA	METERING	
				1500/1A	0.2F55	---	15VA		
			CORE-2	3000/1A	CLPX	V _{Kp} >1000V, R _{ct} <7ohm Im<25mA	---		51S/51NS+CBF-3
			CORE-3	3000/1A	CLPX	V _{Kp} >1000V, R _{ct} <7ohm Im<25mA	---		87C-2 OIFF PROT.
			CORE-4	3000/1A	CLPX	V _{Kp} >1000V, R _{ct} <7ohm Im<25mA	---		87C-1 OIFF PROT.
		T2	CORE-1	3000/1A	CLPX	V _{Kp} >1000V, R _{ct} <7ohm Im<25mA	---	SPARE	
			CORE-2	4000/1A	CLPX	V _{Kp} >800V, R _{ct} <6ohm Im<25mA	---	87B BUSBAR PROT.(OISC. ZONE)	
			CORE-3	4000/1A	CLPX	V _{Kp} >800V, R _{ct} <6ohm Im<25mA	---	87B BUSBAR PROT.(CHECK ZONE)	

NOTES									
LEGEND									
REFERENCE DRAWINGS									
DRAWING TITLE							DRAWING NO.		
DRAWING CONTROL SHEET							CE-195451		
AS-BUILT BY _____ DATE _____									
01	26-03-11	DAR	REVISED AS PER SEC LETTER #03042/0036/JL DATED 22/03/2011				TAMER	YAHYA	YAHYA
00	31-01-11	DAR	FOR APPROVAL				TAMER	YAHYA	YAHYA
REV. NO.	DATE	BY	DESCRIPTION				CHKD.	CERT.	APPD.
الشركة السعودية للكهرباء Saudi Electricity Company									
DRAWN BY: USMAN CHECKED BY: TAMER SCALE: _____ DATE STARTED: 23-01-2011 DATE COMPLETED: _____ OPR'G. DEPT.: _____ ENG. DEPT.: _____									
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							BMC NO. BMYNO.		
132kV SINGLE LINE DIAGRAM WITH CT&VT DATA 380/132/13.8kV SUBSTATION CONSTRUCTION OF NEW 380/132/13.8kV S/S ▪ 9027 RIYADH SAUDI ARABIA									
INDEX	PLANT NO.	DRAWING NUMBER				SHEET NO.	REV. NO.		
P	C257	CA - 181241				04 of 05	01		
SEC-A (2004/18) SEC-B									

SEC-CTA SPEC. NO.	LOCATION	SHUNT REACTOR BUSHING CURRENT TRANSFORMER DATA					FUNCTION
		CT.	RATIO	CLASS	TECHNICAL DATA	BUROEN	
PR 9027	132kV, SR BUSHING	LC1-1	600/1A	PX	---	---	REACTOR DIFFERENTIAL PROT. 87R
			400/1A	PX	---	---	
			200/1A	PX	Vkp>400V, Rct<1ohm Im<50mAe400V	---	
		LC1-2	1200/1A	PX	---	---	REACTOR CONNECTION OIFF.PROT. 87C1
			600/1A	PX	---	---	
			400/1A	PX	---	---	
			200/1A	PX	Vkp>400V, Rct<1ohm Im<50mAe400V	---	
		NC1-1	-	-	-	---	49R
		NC2-1	600/1A	PX	---	---	REACTOR DIFFERENTIAL PROT. 87R
			400/1A	PX	---	---	
			200/1A	PX	Vkp>400V, Rct<1ohm Im<50mAe400V	---	
		NC2-2	400/1A	5P20	---	15VA	NEUTRAL O/C PROTECTION 50N/5IN+FR
200/1A	5P20		---	15VA			

SEC-CTA SPEC. NO.	LOCATION	GIS VOLTAGE TRANSFORMER DATA					FUNCTION
		VT NO.	TYPE	SECOND WIND.	TECHNICAL DATA	CLASS	
PR 9827 SC/P7 9827- 1P4-1	---	VT's	3Ø INDUCTIVE	1'st	132/√3kV : 115/√3V-115V	100VA,CL: 0.2/3P	---
				2'nd	132/√3kV : 115/√3V-115V	100VA,CL: 0.2/3P	---

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